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STATE OF MONTANA
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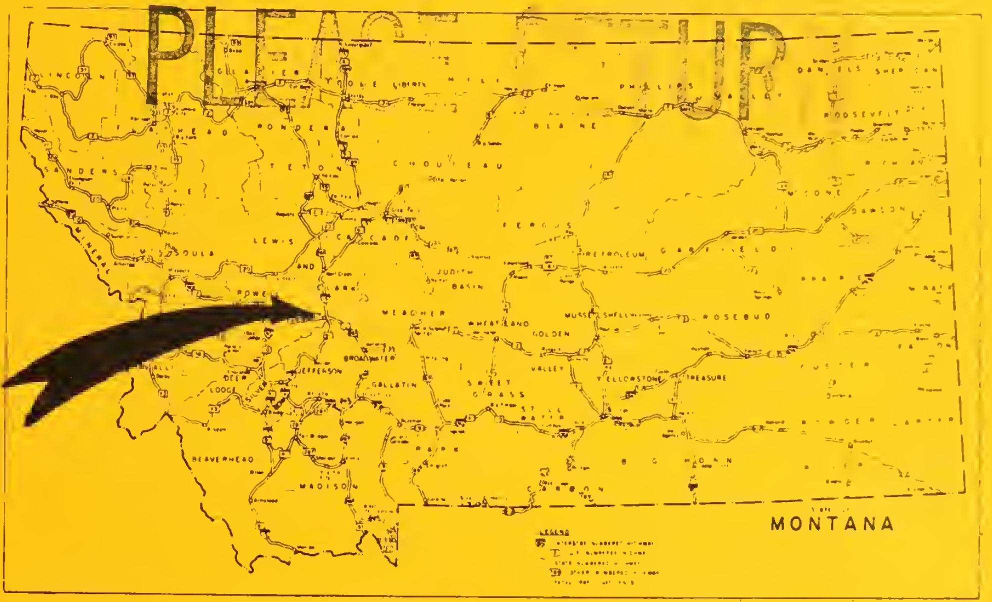
FINAL
ENVIRONMENTAL STATEMENT

ADMINISTRATIVE ACTION
FOR

Project F-249(18)
Helena-West
Lewis and Clark County



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42 U.S.C. 4332 (2) (C)

Date 10-23-74 H.J. Anderson, Director of Highways

By ______________________
Administrator, Engineering Division

APPROVED AND ADOPTED BY THE FEDERAL HIGHWAY ADMINISTRATION

Date ________ By ______________________
F.H.W.A. REGIONAL ADMINISTRATOR

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The following people contributed either directly or indirectly to the preparation of this statement. A brief background resume is included.

Gerald L. Anders received a B.S. degree in Civil Engineering from Montana State University and is a registered Professional Engineer in Montana.

He is Supervisor of the Consultant Design Section and has 12 years experience with the Department of Highways in highway engineering.

Mr. Anders has worked on the preparation of environmental statements for the Department since the initiation of the National Environmental Policy Act.

Daniel Bartsch is a graduate of the University of Montana and holds a B.S. degree in Business Administration. He was employed for 9 years by the Montana Power Company.

Mr. Bartsch has 7 years experience with the Montana Department of Highways and his current position is that of Socio-Economic Studies Coordinator.

Bruce W. Becker is a graduate of Michigan State University with a B.S. in Zoology. He holds a M.S. in Fish and Wildlife Management from Montana State University.

He worked 2 months as Consulting Research Biologist for the U.S. Park Service and has 7 months experience with the Montana Department of Fish and Game.

Mr. Becker has been reviewing environmental impact statements as Biologist for the Montana Department of Highways for 1 year.

Richard A. Howell holds a B.S. degree in Planning from Michigan State University. He was a Planner for Urban Consultant Associates, Montgomery, Alabama from June to November 1966; Regional Planner and Planning Director for Rome-Floyd County Georgia, November 1966 to August 1967; Planner for Billings - Yellowstone - City-County Planning Board August 1967 to October 1967 and February 1968 to July 1968 and Acting Planning Director October 1967 to February 1968 and January 1970 to July 1970; Assistant Planning Director for the same agency July 1968 to January 1970 and July 1970

to March 1971.

He has been Land Use Planner for the Department of Highways for approximately 1 year.

Mr. Howell is a member of the Montana Association of Professional Planners and a Certified Planner-In-Charge in the states of Montana, Idaho and Wyoming.

David S. Johnson graduated from the Montana School of Mines with a degree in Geological Engineering and has since done graduate studies in the engineering and environmental fields.

He is Engineering Specialties Supervisor for the Montana Department of Highways, has 17 years experience in highway engineering, and has worked on the preparation of environmental statements since NEPA.

Mr. Johnson is a registered Professional Engineer in Montana.

S.C. Kologi received a B.S. degree in Civil Engineering from Montana State University and is a registered Professional Engineer in Montana.

He is Chief of the Preconstruction Bureau and has 16 years experience with the Department of Highways in highway engineering.

Mr. Kologi has worked on the preparation of environmental statements for the Department since the initiation of the National Environmental Policy Act.

N.A. Rotering received an LLB degree, now Juris Doctorate, from Georgetown University. He is a member of the Montana Bar and has been in private practice of law in the State of Montana since 1937.

Mr. Rotering is also a member of the bar of the District of Columbia, U.S. Court of Appeals and U.S. Supreme Court.

He has had 12 years experience as a deputy in the Silver Bow County Attorney's office and 4 years as County Attorney. He was a Special Assistant Attorney General from 1957

to 1968 and has been Administrator of the Legal Division of the Department of Highways since 1969.

James G. Sahinen has 28 years experience with the Montana Department of Highways in highway engineering.

He attended Carroll College and Montana State University.

Mr. Sahinen has been reviewing environmental statements for the Department since the inception of the National Environmental Policy Act. He is Assistant Supervisor of the Consultant Design Section.

Donald V. Stocker attended public schools in Rapid City, South Dakota and received a B.S. Degree in Civil Engineering from the South Dakota School of Mines and Technology. Mr. Stocker started working for the Montana Department of Highways in May of 1971. Since being with the Department he has attended the Federal Highway Administration's School on Fundamentals and Abatement of Highway Traffic Noise. He has been working with highway related noise problems since March, 1973.

David A. Twiddy is a graduate of the University of Florida with a B.S. in Civil Engineering and has done graduate studies at both the University of Florida and Montana State University. Mr. Twiddy is Vice President of the consulting firm, Voorhies, Trindle and Nelson, Inc., and a registered Professional Engineer in Montana.

From 1962 to 1969, he was Branch Manager, Project Manager and Project Engineer for Rader and Associates.

V.T.N., Inc. is employed by the Department of Highways for design of the project.

Wayne H. Walters attended public schools in Jerome, Idaho and received a B.S. Degree in Civil Engineering from the University of Idaho. Mr. Walters began working for the Montana Highway Commission in June of 1964 and is a registered Professional Engineer in Montana. In the spring of 1973 he attended a Highway Air Pollution Workshop

sponsored by the Federal Highway Administration. He is presently an Area Engineer in the Location & Road Design Section of the Montana Department of Highways.

SUMMARY

I. Type of Action

(X) Administrative

( ) Draft

(X) Environmental Statement

( ) Combination Environmental/Section 4(f) Statement

( ) Legislative

(X) Final

II. Project Description

The proposed project would be a reconstruction of the 6.0 miles of U.S. Highway 12, located immediately west of Helena, Montana. This project is part of the Highway Department's long-range plan for upgrading U.S. 12 between Helena and the junction with Interstate 90 at Garrison. In 1968, this section of highway was designated a principal arterial, placing it in the same category as the Interstate system.

The Draft Environmental Impact Statement described a proposal for upgrading the present 2-lane road to 4-lane for the entire length of the project. Input from the public hearing held August 23, 1973 was generally critical of 4-lane construction. For this reason, it was decided to change the proposal. The new proposal is to proceed with a design based on 2-lane construction for the 3.8 mile rural section of the project and 4-lane construction for the 2.2 mile urban section. This EIS considers the impacts of 4-lane construction for the whole project, since right-of-way for 4-lane construction of the rural section would be purchased even though only two lanes would be constructed immediately.

Design standards for the rural section are two 12-foot driving lanes with 10-foot shoulders. Eventually, two additional 12-foot driving lanes with a 4-foot inside shoulder and a 10-foot outside shoulder would be added. A median of 46 feet, including inside shoulders, would separate the roadways. Plans include bridges for the crossing of Ten Mile Creek. A bicycle and horse path is being considered.

Design standards for the urban section are two 12-foot travel lanes in each direction separated by a 14-foot painted median. Ten-foot outside shoulders with integral curbs and gutters would border each pair of lanes. A concrete sidewalk would be constructed and a bicycle and horse path is being considered.

III. Environmental Impacts

The major impact of the project would be to upgrade a substandard section of highway, resulting in a safer and more efficient route for the traveling public.

One hundred fifteen acres of land (81 acres agricultural land, 29 acres residential, and 5 acres commercial land) would be acquired for the project. Seventy-five acres of existing highway right-of-way would also be utilized. No residences, productive agricultural units, businesses, churches, public institutions, designated recreation areas, historical, or archaeological sites would be displaced.

Utility relocation would include gas, electricity, and parts of three water lines serving the city of Helena. Relocation of the water lines is a major problem yet to be resolved.

No significant impacts on air or water quality are expected. Noise levels would approach the maximum acceptable in some areas.

The project would not traverse important gamebird or waterfowl habitats, or big game migration routes. Mule deer are common along the western end of the project and it is possible that an increase in deer-vehicle accidents may occur with the 4-lane. Presently, such accidents occur at a rate of about two per year. Since the project would not usurp range to the point where deer would be crowded, it may be that no significant change in the accident rate would occur. No endangered species would be affected by the project.

Construction would cost about 3.2 millions of dollars and would consume about 145,000 gallons of no. 2 diesel fuel, 20,000 gallons of gasoline, and 3,500 tons of asphalt.

IV. Alternatives

Three alternatives were considered for this project. The proposed alternate follows the corridor of the present U.S. 12. A second alternate would be to build the road along a different corridor. This was rejected because it would mean providing access to a

relatively undeveloped area, and because two roads would have to be maintained instead of one. The no-build alternative was rejected because the existing highway deficiencies would not be corrected and because, in our opinion, the adverse impacts of the project would not be sufficient to outweigh the benefits which would be derived.

V. FEDERAL, STATE AND LOCAL AGENCIES AND OTHER ORGANIZATIONS FROM WHICH COMMENTS WERE REQUESTED

* Denotes agencies from which comments were received

Montana Department of Fish and Game
Division of Environment & Information
Sam Mitchell Building
Helena, Montana 59601

Dept. of Intergovernmental Relations
Planning & Economic Development Division
Capitol Post Office (1716 9th)
Helena, Montana 59601

Montana Council of Natural Resources and Development
Room 420, Sam Mitchell Building
Helena, Montana 59601

Board of County Commissioners
Lewis and Clark County
County Courthouse
Helena, Montana 59601

Montana Department of Natural Resources and Conservation
32 So. Ewing Street
Helena, Montana 59601

Superintendent of Schools
Lewis and Clark County
County Courthouse
Helena, Montana 59601

* Honorable Stephen Keim, Mayor
Civic Center
Helena, Montana 59601

* Dept. of Health & Environmental Sciences
Cogswell Building
Helena, Montana 59601

* Postmaster
Helena, Montana 59601

* Environmental Quality Council
State Capitol Building
Helena, Montana 59601

Agricultural Stabilization and Conservation Service
112 West 13th Avenue
Helena, Montana 59601

* City-County Planning Board
38 South Main
Helena, Montana 59601

Department of Housing and Urban Development
Denver Regional Office
Federal Office Building - 19th and Stout Sts.
Denver, Colorado 80202

Soil Conservation Service
4930 Ninth Avenue South
Great Falls, Montana 59401

* U.S. Forest Service
200 E. Broadway
Missoula, Montana 59801

Geological Survey
Federal Center
Denver, Colorado 80225

U.S. Geological Survey
Federal Building
Helena, Montana 59601

Department of Health Service and National Institute of Environmental Health & Sciences
7 West 6th Avenue
Helena, Montana 59601

Economic Development Administration
415 First Avenue,North
Seattle, Washington, 98109

* Environmental Protection Agency
Room 916 Lincoln Tower; 1860 Lincoln Street
Denver, Colorado 82003

* Assistant Secretary-Program Policy
Attention: Director, Environmental Project Review
Department of Interior
Washington, D.C. 20240

Department of Agriculture
Dr. T.C. Byerly
Office of Sec. of Agriculture
Washington, D.C. 20250

VI. DATE DRAFT STATEMENT MADE AVAILABLE TO CEQ

June 27, 1972

FINAL STATEMENT

I. Purpose of the Project and Description of the Proposed Facilities

The proposed project would be a reconstruction of the 6.0 miles of U.S. Highway 12, located immediately west of Helena, Montana. The project would begin a short distance east of the junction with Rimini Road, a county road also known as Ten Mile Road, and would connect to the recently completed 4-lane, at the turnoff to Fort Harrison about 1 mile west of Helena. The Appendix contains maps and an aerial photo of the project area.

This project is part of the Department of Highways' long-range plan for upgrading U.S. 12 between Helena and the junction with Interstate 90 at Garrison. The long range plans are to build 4-lane from Helena to the west side of MacDonald Pass, and improved 2-lane from that point to the junction. U.S. 12 from Helena to Garrison is classified as a major arterial.

The present highway was completed in 1933. Today's larger volumes of traffic and faster operating speeds have made the vertical and horizontal alignments inadequate. The steep slopes of the roadside ditches prevent a driver from keeping control of his vehicle if it leaves the road. The shoulders are too narrow to keep a stalled or parked car off the driving lanes. In addition, the surface is badly worn and needs replacing. In view of the fact that this section of road forms part of the major highway link between the cities of Helena and Missoula, the Department of Highways proposes that this road be upgraded to modern primary highway standards.

Four factors influenced the choice of the facilities proposed.

(1) Traffic projections were made for three sections of the project:

	Year	ADT	DHV	D	Truck Traffic % ADT	Design Speed
Rimini to Colorado Gulch	1972	1,570				
	1976	2,080		55/45	18%	70 mph
	1996	4,750	620			
Colorado Gulch to Dotsonville	1972	1,736				
	1976	2,370		55/45	18%	70 mph
	1996	5,600	730			

	Year	ADT	DHV	D	Truck Traffic % ADT	Design Speed
Dotsonville to end of project	1972	2,220				
	1976	2,980		55/45	18%	50-60 mph
	1996	6,900	900			

ADT = Average Daily Traffic

DHV = Design Hourly Volume: This is the hourly volume of traffic during the 30th highest hour of the year.

D = Direction Distribution

These projections are based on past trends of growth. They reflect volumes of traffic which are expected to use the present facility in the future.

The criteria for determining whether or not a 4-lane highway is needed are an ADT greater than 5,000 and a DHV of over 700, based on the projected traffic volumes 20 years from the beginning of construction. On this basis, it was determined that 4-lane is justified for the Dotsonville area, but marginal for the section of road to the west.

(2) Four-lane construction through Dotsonville is desirable to provide safety and ease of operation for both resident and through traffic. Left turning vehicles would slow down or stop in the median between the one-way lanes to take advantage of breaks in traffic without obstructing traffic. This should virtually eliminate head-on collisions. Rear-end collisions would be reduced because the slow or right turning vehicle would be taken out of the high speed lane. Headlight glare would be reduced, and passing sight distance would be increased.

(3) The third factor influencing choice of facilities was the bottleneck effect of a section of 2-lane road between the 4-lane construction on MacDonald Pass, immediately to the west, and through Dotsonville. Transition from 4-lane to 2-lane introduces a recognized safety hazard to the motorist.

(4) The Draft Environmental Impact Statement (EIS) stated that a 4-lane road was proposed for the entire length of the project. It was felt that the safety advantages of eliminating a bottleneck were greater than the additional cost engendered by building 4-lane at the beginning of the project, even though the traffic projections were marginal.

Input from the public hearing held 8-23-73 was generally critical of 4-lane construction. For this reason, it was decided to change the proposal. The new proposal is to proceed with a design based on 2-lane construction from the beginning of the project to

a point 2.2 miles west of the end of the project. The remaining 2.2 miles would be 4-lane construction. Right-of-way would be purchased for future upgrading of the 2-lane section to 4-lane. Since right-of-way for four lanes would be purchased, this impact statement will consider the effects of 4-lane construction along the entire project.

Two basic road designs are proposed. The first 3.8 miles traverse a relatively unpopulated rural area. The initial construction for this section would be two 12-foot lanes with 10-foot shoulders. Sometime in the future, two additional lanes would be provided. A 32-foot median consisting of inside shoulders and a depressed grassy strip would separate the east and west-bound roadways.

The last 2.2 miles of the project traverse the more heavily settled Dotsonville area. This construction would be 4-lane, consisting of two 12-foot travel lanes in each direction separated by a 14-foot painted median. Ten-foot outside shoulders would border each pair of lanes. Integral curb and gutter would be provided for this section.

The narrow median proposed for the Dotsonville area was chosen to minimize damage to residential properties and Ten Mile Creek. The 32-foot median ultimately proposed for the rural area west of Dotsonville is the minimal desirable separation for a 4-lane rural roadway. This distance is desirable to help avoid head-on collisions, and to reduce headlight glare. Driving speeds tend to be higher in sparsely populated regions, so this separation becomes even more critical. A 76-foot median would be a more desirable design, but was eliminated from consideration due to the increased right-of-way required and the relatively small volume of traffic.

The sharpest horizontal curve would be 3 degrees. The maximum vertical grade would be 4 percent. Roadside ditches would have 6 to 1 slopes.

Dual bridges would be provided where the new construction would cross Ten Mile Creek.

A concrete sidewalk is planned for the north side of the road through Dotsonville. A bicycle and horse path is being considered for the project.

II. Alternatives

The preceding section described the present and projected limitations of U.S. 12 through the area of the proposed project and presented the Department of Highways' plan for upgrading the road. The following sections of this report describe the impacts of the

proposed construction. Before proceeding, a discussion of other alternatives is in order.

The possibility of building the road along a different corridor was brought up at the public hearing. As mentioned in the Draft EIS, the Department of Highways has examined possible routes nearer to the Fort Harrison Veterans Hospital and a route paralleling the north side of Ten Mile Creek. These routes would create access to previously undisturbed areas. The potential secondary impacts of building along one of these routes (subdivisions, destruction of wildlife habitat) would be much more serious than those experienced in the U.S. 12 corridor. In addition, if a new route were chosen, the present road would have to remain to serve the people presently living along it. This would mean that two roads would have to be maintained instead of one.

The Department of Highways decided that the no-build alternative was not appropriate for two reasons. First, it would not alleviate the substandard condition of the present highway or meet the needs of future traffic. This is an important reason for building the project but the over-riding criteria must be that the benefits derived from construction outweigh the costs incurred. The impacts of the project are discussed in the following sections of the report. In our opinion, the adverse impacts are not sufficient to outweigh the benefits which would be derived.

For these reasons, reconstruction along the present alignment seems the best alternative.

III. Description of Existing Environment

The project begins at the upper end of a narrow valley approximately 6 miles east of the summit of the Continental Divide, and gradually descends in elevation along a gentle slope with southern exposure to a point where the project crosses Ten Mile Creek. This point is approximately 2.5 miles from the beginning of the project and near the intersection of a county road from the south that proceeds up Colorado Gulch. From the crossing at Ten Mile Creek to a point 5 miles from the beginning of the project, the route closely follows Ten Mile Creek. Ten Mile Creek is on the north and steep canyon walls are on the south. At this point, the project proceeds through a residential area known as Dotsonville and terminates at the junction with State Route 356, also known as the Fort

Harrison turnoff.

Ten Mile Creek is a small drainage (about 20 feet wide during high water) that presently enjoys mostly stable, vegetated banks which provide excellent trout habitat when the stream is not dewatered due to irrigation. The upper reaches of Ten Mile Creek, outside the limits of this project, are a source of water for the City of Helena. The water is transported to Helena from a reservoir near the west terminus of this project, through one 24-inch and two 16-inch pipelines that are buried along or under the present road.

Elevations along the project range from 4,300 ft. to 3,950 ft. The terrain varies from open grassland with scattered pine, to irrigated crop lands, and creek bottom with willows and cottonwood trees. Summers are warm, seldom exceeding 85 degrees, but winter temperatures may drop as low as minus 40 degrees. The growing season extends from June to September. Precipitation averages 14 inches per year with heavy snowfalls being normal at these elevations.

No designated parks, campgrounds or recreational facilities lie within the project limits. The area has a natural rugged beauty which could be developed so that it would receive more attention and use. The surrounding area abounds with mining history, with many old mine shafts, and ghost towns in the near vicinity. The new highway would follow closely the old roadbed of the Helena and Red Mountain Railroad Company which served the mining community of Rimini and the mines in that area in earlier days.

No important historical sites fall within the limits of the project.

Some elk and numerous mule deer are found mostly at the westerly end of the project. Smaller animals such as rabbits, ground squirrels, and chipmunks are common. Few upland game birds and waterfowl are found along the project. No endangered species are known to occupy the area.

Ten Mile Creek supports fair sized populations of pan sized rainbow and brook trout in the spring prior to dewatering.

Present land use along most of the valley is generally undeveloped grazing or irrigated crop land. Currently, there is no county-wide zoning plan in effect for this

area, although such a plan is proposed by the City-County Planning Board for parts of this area, especially through Dotsonville.

There are presently three principal county roads feeding into the project. These roads service Colorado Gulch, Rimini, and Priest's Pass. The Colorado Gulch and Rimini areas contain many permanent homes and have considerable potential for future residential development. Residents of these areas commute to Helena for employment, causing traffic on the present highway system to increase substantially from 7 AM to 8 AM and between 5 PM and 6 PM.

Numerous utilities are located within the highway corridor. As mentioned previously, three municipal water lines, two 16-inch and/or one 24-inch, are along or under much of the length of the proposed project. In addition, power and telephone lines closely parallel the existing highway. Natural gas and water lines are under the existing highway through the Dotsonville area.

IV. Impacts of the Project and Mitigating Measures

A. Land-Use

Construction of this project would ultimately require recommitment of 115 acres of land. This land is currently used for the following purposes: agriculture, (81 acres of grazing and irrigated hay fields), residential (29 acres), and commercial land (5 acres). Seventy-five acres of existing highway right-of-way would also be utilized.

Three acres would be required for 4-lane construction in the Dotsonville area and would represent a commitment for the life of the road. Since only two lanes would be constructed in the rural area for the present, the remaining right-of-way would be available for grazing and agricultural use until the other two lanes were constructed.

B. Residences, Businesses, and Institutions

No families would be displaced as a result of construction of this project. Right-of-way requirements would result in the loss or relocation of some property including shrubbery, decorative fences, and lawns.

The only business establishment along the present highway is the State Nursery. Five acres of productive land would be required for highway construction but no buildings would be involved. The nursery is planning to expand its facilities and the loss of land required for right-of-way could be compensated for in the expanded facility.

No hospitals, public buildings, or churches would be adversely affected by the project. Baxendale School, located near the west end of the project, is abandoned except for use as a polling place during elections. It would not be disturbed.

C. Highway Safety

As was discussed in Section II, the present highway is inadequate by current standards. The proposed construction would improve on existing deficiencies. This would result in a more safe and efficient route for both through and local traffic.

The residents of Dotsonville would benefit, especially, because of the much safer provisions for turning movements into and out of their properties. The 14-foot painted median would allow left-turning vehicles to remain out of traffic until a gap large enough for the turn occurred. Similarly, right-turning vehicles would be positioned in the slow lane with the fast lane available for following traffic to pass them.

The new highway would facilitate police, fire department, and ambulance calls. Since the area's schools, churches, and shopping centers are located in Helena, access to these facilities would be improved.

D. Recreation

Opportunities for recreation along the project include the limited fishing available in Ten Mile Creek; hunting, if access can be gained to the privately owned lands; and sightseeing, especially along the western two-thirds of the project. Construction of the project would have no appreciable effect on fishing or hunting, but some individuals might feel that the aesthetic nature of the "Sunday afternoon drive" would be lessened due to the faster design speed and modern appearance of the new facility. Other individuals may disagree. The slow lane of the 4-lane highway would make sightseeing much safer than on the present 2-lane road.

This section of U.S. 12 is part of the Old West Trail, a self-guided automobile tour

leading to many of the West's scenic and historic sites. The trail is publicized by the state governments of Montana, Wyoming, North and South Dakota and Nebraska. The proposed project would help to accommodate the demands placed on it by its designation as a tourist route.

E. Fisheries and Wildlife

The Department of Fish and Game advised the following in a letter dated June 1, 1971: "In the vicinity of stations 924 and 1024 the proposed road alignment is in very close to Ten Mile Creek. While it appears that no stream encroachment will be necessary, it will be important to retain as much streamside vegetation as possible. Any vegetation which has an influence on the stream in terms of cover, bank stabilization, shade, etc. should be preserved. The stream presently enjoys mostly stable, vegetated banks which provide excellent trout habitat." This advice would be followed in the design of the roadway. Loss of some streambank vegetation at the site of the new bridges would be unavoidable, however. Riprap would be used at the bridge abutments to minimize stream bed scour and bank erosion.

Consideration of the previous factors plus the normal erosion control measures would result in the minimal unavoidable impact on aquatic populations.

A total of 190 acres of land, including 75 acres of existing highway right-of-way, along the 6 mile route would be required for construction. This means that fewer non-game mammals and birds could occupy the area.

The roadway does not transect a deer or elk migration route, or traverse important waterfowl or upland game bird production areas, so no adverse impact would occur from this standpoint. The area adjacent to the beginning of the project and the south facing slopes to the north and west are used by mule deer as winter range. Although concentrations of deer are seldom seen directly adjacent to the project, movements across the road occur.

Examination of the Highway Patrol's accident records for the section of road to be replaced by this project shows that two collisions between wildlife (probably deer)

and vehicles occurred in both 1972 and 1973. This accident rate is far below the Montana Department of Highways' criteria for defining a problem area (10 accidents in 0.5 miles in 2 years).

Whether or not this accident rate will increase following construction of 4-lane is impossible to determine from our present state of knowledge. An examination of the wildlife literature by our biologist turned up only one study dealing directly with this subject. Reilly and Green (1974) working in Michigan, found that collisions increased drastically following 4-lane construction, but that they tended to decline toward the old 2-lane level after several years of high collision rates. Details of the size of the winter range, patterns of use, and other factors which would be useful in comparing their situation with the present one were not given.

In the present situation, the amount of land required for right-of-way would be insignificant compared to the range available; the deer would not be forced into a crowded condition along the road. This would seem to make a great increase in collisions unlikely, although a definitive conclusion is impossible.

F. Water

Soil tests performed by the Montana Department of Highways indicate that there are four or five highly saturated or swampy areas along the proposed alignment. These areas are in the deep ditches along the present highway. In most cases, the elevations of these areas are lower than the flow line elevation of Ten Mile Creek and could be classified as springs or seeps. It is also likely that the water mains paralleling the highway are leaking and contributing to the highly saturated conditions. The following quotation was taken from a Montana Department of Highways Interdepartmental Memorandum dated March 28, 1972. "Wet organic soils will be encountered; however, this material should be removed during normal grubbing procedure. The existing ground on the project should not compact under the fill heights used on this project." We conclude that there should not be any detrimental effect to the ground water table as the result of the embankment being placed on the highly saturated areas or other areas of the project.

Pollution of Ten Mile Creek would be held to the minimum because of the following

measures:

(1) Construction activities would not infringe on the channel of the stream or disturb streamside vegetation except at the site of the new bridges. Changes to the channel at the site of the bridges would be limited to the minimum necessary. Riprap would be used to minimize scour of the stream bed and erosion of the banks. The design of the new bridges would provide better hydraulic features than the present structure.

(2) Sufficient culverts would be installed to retain natural drainage patterns and prevent accumulations of surface water on the roadway or in the ditches.

(3) Areas in which the soil would be bared due to construction would be planted with appropriate vegetation to stabilize the soil and thus prevent siltation of the creek.

(4) Construction work near the settling reservoir for the city of Helena's water system would be coordinated with the City of Helena so that the water supply would not be endangered.

(5) Servicing of vehicles and equipment would be done in such a manner and place that the city's water supply would not be endangered.

(6) The road and bridge contractor would be required to meet the requirements of the applicable regulations of the Department of Fish and Game, Department of Health and Environmental Sciences, and other state and/or federal regulations relating to the prevention or abatement of water pollution and siltation which are applicable when the contract is let.

G. Utilities

One 24-inch and two 16-inch water lines lie parallel to, or under the shoulder of the present roadway. Using a 4-lane design for the entire length of the project, the 24-inch steel main would lie under the proposed roadway from station 860 to station 1044 (18,400 feet). The two parallel 16-inch mains would be within the limits of construction from station 880 to station 1048 (16,800 feet). One 16-inch main branches from the Yaw Yaw junction at station 1048 and would conflict with the new road from station 1048 to station 1118 (7,000 feet).

The City of Helena constructed a 24-inch steel main from Yaw Yaw intersection (station 1048) to the vicinity of the Fort Harrison turnoff (station 1118) in 1973. This main was placed along the north side of the pavement of the present road. The pipeline was specifically engineered to lie under the shoulder of the proposed 4-lane road and not under the driving lanes.

At the time of this writing, plans for relocating the pipelines have not been resolved between the Department of Highways and the city of Helena. This problem is considered further in the discussion on economics, in Section M of this statement.

A 2-inch natural gas main belonging to the Montana Power Company is located along the south side of the existing highway from station 1055 to the end of the project (6,328 feet). Relocation of this utility will require renegotiations of easements with private landowners. A short disruption of services may occur during relocation.

Conflict between the utilities and the proposed highway is inevitable due to the narrowness of the corridor. In some areas, the steep rock slopes and Ten Mile Creek would make relocations difficult.

H. Air

The projected traffic figures for this project are based on an assumption of natural growth irrespective of the type of facility. In other words, upgrading the present facility is expected to have little influence on the volume of traffic using the road. On this basis, no significant long-term adverse impact on air quality would be expected as a direct result of the project.

It is likely that the new facility would reduce the concentration of auto emissions due to the improved traffic flow characteristics the 4-lane design would provide. Both carbon monoxide and hydrocarbon emissions are reduced as a vehicle's speed increases and braking and acceleration movements are reduced.

The requirements for review of projects as established by the Environmental Protection Agency are an indication of the minor amount of air pollution that would be produced by traffic using this route. Their concern for air quality on this project

would begin if the 10 year projected traffic volumes reached 12,000 to 13,000 ADT. This is about double the levels of our 20 year projections.

This project is not in conflict with the state's Implementation Plan for complying with federal ambient air quality standards.

The actual construction of the project would have a short-term detrimental effect on air quality. Dust would be added to the air even though preventive actions would be taken. Exhausts from construction equipment would add to vehicle caused pollution. Emissions from cars would increase due to the slower operating speeds and the occasional hold-up of traffic while blasting and other construction activities took place.

I. Noise

As was discussed in the previous section, upgrading the present 2-lane highway would have very little influence on the volumes of traffic using the facility in the future. Therefore, the noise generated by increased traffic would not be contributable to the project. Other aspects of the project would have an impact on noise pollution.

Construction of a 4-lane facility, particularly through Dotsonville, would result in some of the houses being closer to the new highway than they now are to the present one. Noise studies and predictions were made for six residences along this route to determine the magnitude of noise impact due to 4-lane construction. The particulars of these studies are presented below. Station locations are shown on the aerial photo in the Appendix. A general discussion of noise measurement terminology is presented in the Appendix for those people who are unfamiliar with this subject.

	Gunlock Residence	Poole Residence	Bergan Residence	House as on the plans	T. Mill Residence	Rodgers Residence
Station Location	822+	1062+	1078+	1069+	1098+	1103+
Measured L_{10} 8/1/73	59dBA	60dBA	61dBA	61dBA	61dBA	64dBA
Predicted L_{10}, 1996	70dBA	67dBA	67dBA	69dBA	70dBA	67dBA

The Montana Department of Highways uses a Type 1 precision B & K Noise Meter and a precision Nagra IV Tape Recorder on all noise studies. Noise is monitored and recorded for ½ hour at each location. The recorded tapes are then taken back to headquarters to be evaluated. The tapes are played into a B & K Model 2305 Level Recorder and that information is fed into a B & K Model 4420 Statistical Distribution Analyzer. The information

obtained from the statistical distribution analyzer is then fed into an IBM 370/145 computer which computes the L_{10} noise level.

The Montana Department of Highways has two procedures available to them for prediction of highway noise: one procedure is based on the methodology given in Report 117 of the National Cooperative Highway Research Program ("NCHRP") and the other is essentially a computer method devised by the Transportation Systems Center ("TSC"). Both of these procedures have been approved by the Federal Highway Administration. The NCHRP 117 method was used on this project to predict the noise levels.

The following table showing noise level/land use relationships was taken from the Federal Highway Administration's February 8, 1973 Policy and Procedure Memorandum 90-2 which established noise standards and procedures for highway construction.

DESIGN NOISE LEVEL/LAND USE RELATIONSHIPS

Land Use Category	Design Noise Level - L_{10}	Description of Land Use Category
A	60dBA (exterior)	Tracts of lands in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	70dBA (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	75dBA (exterior)	Developed lands, properties or activities not included in categories A and B above.
D	--	For requirements on undeveloped lands see paragraphs 5a (5) and (6), this PPM.
E	55dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

The area along the proposed project would fall under land use categories B and F. It can be seen that some of the projected L_{10} 1996 noise levels are the maximum acceptable

under category B.

The Gunlock residence would experience the greatest noise impact. The noise levels would increase an additional 11dBA by the design year of 1996. This would sound about twice as loud to people in the Gunlock yard. The Rodgers' residence would have a 3dBA increase by the design year of 1996. This would be barely perceptible to people in the Rodgers' yard.

Tests conducted throughout the United States have shown that a light frame building will give a noise reduction of 20 to 25 dBA. Therefore, the L_{10}=70dBA at the Gunlock residence for peak hour traffic volume is not as bad as it looks at the first glance. PPM 90-2 states that the maximum acceptable interior design level is L_{10}=55dBA. Using the attenuation factor for a light frame building, the interior level at the Gunlock residence would be L_{10}=45 to 50dBA depending on if windows are open or not. Interior levels for the rest of the residences would be about the same or lower during peak hour traffic volumes.

Although the projected noise measurements do not exceed Federal Highway Administration maximums, two cases were borderline. The Montana Department of Highways has investigated possibilities for reducing the noise in the borderline areas and decided that none are practical for the following reasons. The additional right-of-way necessary for a buffer zone is not available in the Dotsonville area. The other possibility, construction of a barrier, is impractical because of the necessity of acquiring additional right-of-way and because of the numerous gaps which would have to be made in the barrier to provide access to the homes. In addition, a barrier would be a hazard to any motorists leaving the highway out of control.

During construction of the project, the noise levels in the area will be higher than normal due to the operation of construction equipment and the increased stop and go movements of traffic. Blasting might also be necessary.

J. Social and Economic Systems

Comments made during the public hearing for this project held on August 23, 1973 and responses to the draft E.I.S. called for additional evaluation of the effects of the

project on Helena's social and economic systems. Impacts on development of subdivisions west of Helena, downtown businesses, and strip commercial development are discussed.

Development of Subdivisions West of Helena

According to the Helena City-County Planning Department, a potential for development of at least 900 additional homes is present in the Colorado Gulch and Rimini Gulch areas. Other areas along U.S. 12 to Elliston may also be suitable for development.

Several factors are necessary for development of large subdivisions. These include: suitable topography and geology; availability of utilities; highway access; and proximity to places of employment, the central business district, shopping facilities, schools, churches, and recreation facilities. A new highway would influence development of subdivisions primarily if it would create needed access or reduce to an acceptable level the time of travel to places of employment, shopping facilities, etc. Studies have shown that when travel time to centers of employment is less than 30 minutes, the subdivision site location is considered good (Community Builders Handbook, 1968). When such travel time is over 30 minutes but not more than 45, the location is fair. A location requiring over 45 minutes travel time is poor.

On this basis, development of the Rimini and Colorado Gulch areas could occur irrespective of construction of the proposed project, since travel time to Helena is less than 30 minutes. In other words, the present access is not a significant factor limiting development.

Current travel time from beyond MacDonald Pass to Helena is at least 30 minutes. The proposed project would complete a 4-lane facility which would reduce this travel time. This would tend to make the area more favorable for subdivisions, although the uncertainty of weather conditions over the pass, recent increases in the cost of gasoline and oil, and increased cost per unit of land resulting from 7-1-74 changes in the Montana Subdivision and Platting Act tend to inhibit development. (The latter requires that all parcels of land less than 20 acres be platted and subject to subdivision regulation.)

The Department of Highways received a request from the City-County Planning Department (see letter in Section VIII) to develop a system of limited access points to the proposed roadway in order to help protect the smooth flow of traffic and to help control future development of the area. The following plan was devised. It is our opinion that the plan would help to provide a free flow of traffic due to limiting the number of turning points, but it would probably not control types of development along the project. Such control would have to come from subdivision regulations, zoning, and deed restrictions.

Recommended Access Control Standards - F 249 (18) Helena-West

The following access control standards are recommended to be applied on subject project from the west end of the project to a property line west of Dotsonville at Station 1054+40.

All access control rights taken by this project would be purchased. Thus the "before situation" would be the existing situation wherein there are no access limitations to the existing two-lane highway except for those imposed by the current approach standards of the Montana Department of Highways. The "after situation" would be the land as it would be after the purchase of the right of way, and access rights, as may be necessary to impose the limitations of access set forth below.

Access rights will be acquired by purchase at the time the right of way for the new project is secured. All private rights of access will be acquired except that at-grade approaches to the main roadway as outlined below may be allowed at the time of the right of way acquisition. After acquisition is complete, no additional private approaches as outlined below will be allowed, and additional farm field approaches may be allowed only if good cause is shown.

PRIVATE APPROACHES:

Private approaches not to exceed 4 per side per mile may be allowed. However, where more than 4 private approaches actually exist, these same approaches may continue at the same locations.

FIELD APPROACHES:

Additional private field approaches may be allowed for access to farm field. The

Agreements allowing such approaches must limit the use served to farm field access. These approaches may not serve occupied residences, commercial enterprises, or any other use except farm field access. Farm field approaches will be issued temporary permits by the Permit Unit - Department of Highways

PUBLIC ROAD APPROACHES:

Existing public approaches may be replaced. Public road approaches will be limited to a maximum of 2 per side per mile. Public approaches up to the limits shown may be allowed either during the construction or after the construction.

Public road approaches in addition to those in existence at the time of construction will be subject to the approval of the local planning agency having jurisdiction over the area, the County Commissioners and the Department of Highways.

Approval of any subdivision plats requiring access to the highway should take into account the limitation on the number of public road approaches. Such subdivision plats should provide for continuity of local access from one subdivision to another.

LOCATION OF APPROACHES:

Approaches should be located opposite one another whenever feasible. This is very critical in the case of public road approaches and heavily used private approaches; it is less critical in farm approaches and other approaches having very limited use. Median crossings and left turn lanes may be provided and altered as traffic conditions may dictate at the discretion of the Department of Highways.

Impact of Strip Developments on the Urban Renewal Program, Residential Areas, and the Highway Facility

The proposed facility would be provided for two basic reasons, to correct the inadequacies of the present road, and to serve the projected higher traffic levels. The latter assumes some residential development west of Helena. This assumption is based on the University of Montana's Helena, Montana Economic Growth Study (1974) and the fact that such development is already occurring.

Additional residential development along U.S. 12 may well provide potential supporting business for shopping and restaurant facilities along the route. These strip developments could have several important impacts:

(1) Competition with Helena's downtown businesses and the Urban Renewal Program could occur if downtown type services were offered along U.S. 12. In general, downtown type businesses tend to provide general merchandise, apparel, home furnishings, and specialty goods and services; while strip developments tend to provide convenience goods and personal services (Planning Design Criteria, 1969). Responsibility for avoidance of conflict lies with city and county planning authorities.

(2) Conflicts between commercial development and residential areas may occur. This could be controlled by zoning.

(3) Development of commercial establishments along the route could lead to problems with traffic friction due to unplanned for increased turning movements from vehicles entering and exiting the establishments. This potential problem would be minimized by the 4-lane design with 14-foot painted median proposed for the Dotsonville area. Such a facility would minimize problems with entering and exiting traffic. In addition, the Department of Highways would have some control over new approaches to the highway (Approach Standards for Montana Highways, 1974). Local planning authorities would also have input. A controlled access plan has been developed for the rural section of the project. No such plan was developed for the Dotsonville area because there are already too many access points for such a plan to be effective.

K. Aesthetics

The right-of-way required would, in some cases, have to come from the yards of houses along the route. This would result in smaller yards and loss of some landscaped features such as trees and hedges. The smaller yards would, no doubt, be regarded as a permanent adverse impact on the aesthetics of the area by the residents. Removal of landscaped features would be a more temporary impact because, in time, they can be replaced. The Department of Highways would make minor alignment adjustments which would provide the minimum disturbance to residences along the project.

Construction activities would scar the landscape. This impact would be minimized by choosing an alignment which would avoid large cuts and fills to the greatest extent possible.

All scars, except those exposing solid rock, would be topsoiled if necessary, and seeded or sodded with appropriate vegetation to provide a pleasing appearance and to control erosion. Trees and shrubs removed during construction would be replaced if the property owner so wishes.

L. Historical and Archaeological Remains

Mr. Ashley Roberts, the State Historic Preservation Officer, was contacted concerning the presence of any sites along the project which may have been designated as Historic Sites under the Historic Preservation Act of 1966. He stated (letter Section VIII) that no such sites are present or proposed with the exception of the Broadwater Hotel and Spa, which is located on the north side of U.S. 12 at the end of the project. More recently, a decision was made to dismantle the buildings and sell the components at auction.

In any event, the proposed alignment would not infringe on this property.

The University of Montana's Statewide Archaeological Survey would examine the route about 1 year prior to the beginning of construction. If historical or archaeological artifacts were found at that time, disposition would be made according to the recommendations of the Survey. If artifacts are uncovered during construction, the Survey would be notified and disposition of the artifacts would follow their recommendations.

M. Economics

The following list provides estimates of the costs of various aspects of the project. Costs were estimated for three categories: construction, right-of-way, and relocation of utilities.

		4-lane Urban and 2-lane Rural	4-lane Urban and Rural
Construction (Roadway and Bridges)			
Urban 4-lane (2.2 mi.)		$ 544,000	$ 544,000
Rural 4-lane (3.8 mi.)		0	$ 1,106,000
Rural 2-lane (3.8 mi.)		$ 677,000	0
	Total	$ 1,221,000	$ 1,650,000
Right-of-Way		$ 325,000	$ 325,000
Relocation of Utilities			
Power		$ 35,000	$ 35,000
Telephone		$ 67,000	$ 67,000

Gas		$ 16,000	$ 16,000
Water Mains		$ 1,064,000	$ 1,064,000
	Total	$ 1,182,000	$ 1,182,000
	Total for Project	$ 2,728,000	$ 3,157,000

The major economic problem which remains to be resolved concerns relocation of the water mains. The cost for moving the mains completely from under the proposed road would be 34 percent of the total cost of the project.

The key question is whether or not the mains are in sound condition. This will determine the necessity and liability for relocation. It is the Department of Highways' policy to require the owner to replace at his own expense prior to highway construction any utility which would conflict with construction, if it would normally require replacement within 10 years after construction. This is done to protect the state's investment. On the other hand, if the utility is sound but requires moving or replacement because of the project, the state would pay 75 percent and the owner 25 percent if the utility is on state owned right-of-way. The state would pay 100 percent of the cost if on private land.

Regardless of the way the above problem is resolved, several alternatives exist which could lower the cost of relocation:

(1) Relocation costs would be reduced by an estimated $110,000 if the road were built along the boundary line between the Reinhold Isaak and David Mattice properties (stations 900 to 930 on the aerial photo).

(2) The 2-lane rural section could be built to avoid the water mains to the greatest extent possible. When the additional two lanes are added, it is possible the old mains would have been replaced by the city to a new location not in conflict with the new road.

(3) Since relocation costs would be such a large part of the total cost of the project, the best expenditure of public funds might be to simply build the road over the mains and take the chance that they would not require replacing in the near future.

This problem would be resolved with the city of Helena as plans for the project

advance. It is felt that a final solution to the problem at this time is not critical to the Environmental Impact Statement. Such decisions are more properly made at a later stage in the design process.

N. Energy

Construction of the project is not expected to significantly alter traffic volumes or traffic routing patterns. For this reason, no discussion of traffic fuel consumption is necessary. The following oil based products would be used for project construction:

Diesel No. 2	145,000 gallons
Gasoline	20,000 gallons
Asphalt	3,500 tons

V. Adverse Environmental Effects Which Cannot Be Avoided

The only significant impacts on the environment generated by the project would be the loss of land the private landowners would experience and the temporary inconvenience to the residents of the area due to construction.

VI. Effect of the Project on the Long-Term Productivity of the Area

This project is basically a reconstruction of an existing road, not a new access to a previously undisturbed area. For this reason, the project would have virtually no significant impact on the long-term productivity of the area. The two possible exceptions to this statement involve the loss of agricultural land and the possible increase in deer mortality. To our knowledge, the loss of pasture and irrigated hayland would not be enough to seriously hinder any of the ranching operations along the project. A reduction in the size of the deer population is a possibility but not a certainty.

The present road is inadequate according to present highway standards; this alone is adequate to justify upgrading the facility, though not necessarily to 4-lane standards. We are proposing a future full length 4-lane facility because our traffic projections, which are based on past trends, indicate that much higher volumes of traffic will use the route in the future. The higher population levels and increased mobility which would cause this increase in traffic will occur whether the project is constructed or

not. The increase in population will occur at the expense of some environmental characteristics which would be sacrificed to support the larger number of people. The loss of agricultural land and deer habitat engendered by the present project is part of this price. The Department of Highways does not necessarily favor this increase in population but must be responsible to its duty to provide a safe and efficient transportation network for the people of Montana.

VII. Irreversible and Irretrievable Commitments of Resources

Construction of this project would result in the commitment of the following resources:

(1) About 2.1 millions of dollars, not including relocation of water mains.

(2) Eighty-one acres of agricultural land (grazing and irrigated hay), 29 acres of residential land, and 5 acres of commercial land.

(3) The materials used for construction.

If the highway is abandoned in the future, the right-of-way would revert to private ownership if it were no longer needed for highway purposes.

VIII. Coordination with Other Agencies, Problems, and Objections

The agencies which were asked to review the Draft Environmental Impact Statement are listed in the Summary. Their replies are published later in this section along with our disposition of their comments.

Continued coordination between the Department of Highways and the city of Helena, the Department of Fish and Game, Lewis and Clark County, the Department of Health and Environmental Sciences, and other interested agencies will be maintained as this project develops.

Other input to the project came from the public hearing held on August 23, 1973. The transcript of this hearing has been published as a separate document and is available from the Public Hearings Unit of the Department of Highways, 6th and Roberts Streets, Helena, Montana 59601. A summary of the objections presented at the hearing and our comments are presented later in this section.

Comments Received in Response to the Draft EIS

This section presents the letters in reply to the Draft EIS and our answers to the questions raised. To save space, our comments will be grouped together, rather than using a separate page for each answer. The comments are presented prior to the letters.

MONTANA DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES, 7-10-72.

(Par. 2) See Section IV, J. We do not believe that the proposed project would have a major effect on either development of subdivisions or traffic volumes.

(Par. 3) The section on impact on air quality (Section IV, H.) has been re-evaluated since the Draft was published because of the new information presented in Section IV, J. Since the project would not significantly affect traffic volumes, it cannot have an adverse long-term impact on air quality. On the contrary, the smoother flow of traffic resulting from the project should decrease the level of pollution produced regardless of the volume of traffic when compared to the same volume of traffic on the present road.

(Par. 4 and 5) These points are included in Section IV, F.

(Par. 6) This would be done as a matter of course.

MAYOR, CITY OF HELENA, 7-10-72.

No comment required.

MONTANA ENVIRONMENTAL QUALITY COUNCIL, 7-11-72.

No comment required.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, 7-25-72.

(Par. 4) All reasonable measures would be taken to reduce the impacts caused by construction activities.

U.S. GEOLOGICAL SURVEY, 7-25-72.

(Par. 2) No blasting would be done in this area.

CITY-COUNTY PLANNING DEPARTMENT, 8-3-72.

(Par. 1) The Draft Statement has been extensively revised in answer to this and other similar criticisms.

(Par. 2 and 5) Section IV, J of this report provides a greatly expanded discussion of the effects of the project on development of subdivisions, strip developments, and downtown businesses. Section D discusses the impact on recreation.

Our new information indicates that construction of the project would have much less effect on development of the Colorado and Rimini Gulch areas than was originally thought.

Our traffic projections take into account development of these areas, so no unexpected traffic would come from this source. A limited access plan (Section IV, J) was formulated at your suggestion. It would help to provide a smooth flow of traffic, but it would not greatly affect development in the area.

(Par. 4) A grassed median would be provided when the rural portion of the route in constructed to 4-lane standards some time in the future. All cut and fill areas would be revegetated except rock cuts.

HELENA POST OFFICE 8-5-72

(Par. 2 and 3) The 10-foot outside shoulders should provide plenty of room for delivery of mail. No frontage roads would be provided because construction of them would necessitate removal of the residences they would supposedly serve.

U.S. DEPARTMENT OF THE INTERIOR, 8-11-72

(Item 1) As indicated in Section I, the alignment of the present road is not suitable for use as one set of lanes for a 4-lane. The new road would be constructed over the existing highway as much as possible to minimize the amount of new right-of-way necessary.

The bridge designs have not been developed in any detail at this time. It is anticipated that the bridges would be located south and west of the present structure.

(Item 2) Section III contains a description of the fish and wildlife resources of the area. A discussion of the impacts on these resources is found in Section IV, F. Impacts on recreational resources are discussed in Section IV, D.

(Item 3) We do not now anticipate that any channel relocation would be necessary. The impacts on the stream would be loss of riparian vegetation at the location of the bridge abuttments and whatever sediment escapes from the siltation control measures (coffer dams, settling basins). Riprap would be used to stabilize the stream banks where they are disturbed by placing the bridge. The loss of vegetation and sedimentation would have a temporary adverse effect on the aquatic populations but the magnitude of this impact would be small because of the limited disturbance of the stream and the protective measures which would

be taken.

Rimini Gulch and MacDonald Pass would not be opened to residential and recreational development as a result of this project (Section IV, D and J).

See our answer to comment 2 for impacts on fish, wildlife and recreation.

This project would not cross wildlife migration routes. It is possible that the widened highway and higher design speed would increase the number of deer killed. On the other hand, deer-vehicle accidents are rare on the present road. This may be an indication that few deer cross the road. It is impossible to predict the magnitude of this impact.

It is not known at this time where fill for the project will come from. Little fill would be required due to the relatively flat nature of the terrain. Borrow areas would be shaped and revegetated to blend with the surroundings as much as possible.

Impacts on water quality and trout habitat were covered in our earlier comments.

See Section IV, K for the impacts on aesthetics.

The State Liason Officer for the National Register is routinely contacted with regard to all proposals for highway projects. His letter is published in this section.

(Item 4) Removal of vegetation would be kept to a minimum along Ten Mile Creek; the project would be revegetated.

We are aware that research is being done on using fences, mirrors, and other devices to reduce vehicle-big game collisions. We do not feel that enough is known about the subject to warrant using these devices at this time. In any event, there is no particular reason to believe that an increase in deer-vehicle collisions would occur on this project.

Ten Mile Creek is not considered a good fishery, and is not big enough to float by boat.

A bicycle trail is being given serious consideration.

(Item 5) As mentioned in reply to Item 1, the present road is not suitable for use as part of the 4-lane.

As indicated in Section II, we do not believe that it would be practical to construct the project along a different corridor. This narrows the practical alternatives

to the no-build and the proposed project. The need for the project and its impacts have been described to the best of our ability in this EIS. The consequences of the no-build alternative may be easily inferred from these data. In our opinion, all practical alternatives have been covered in equal detail.

(Item 6) This section, Section VI, was rewritten.

ENVIRONMENTAL PROTECTION AGENCY, 8-14-72.

(Item 2) The section of U.S. 12 between the west side of Mac Donald Pass and Garrison will eventually be upgraded to improved 2-lane (Section I). A 4-lane facility will not be needed in the foreseeable future. If 4-lane were proposed for the entire route, the facility would be expected to draw traffic into the area. This would not be expected with improved 2-lane. Since construction in this corridor will not influence traffic volumes, there seems little need to make an evaluation of the total highway improvement in this EIS.

(Item 3) This was done, see Section IV, J.

(Item 4) Since the project will essentially have no influence on development in these areas, it does not seem appropriate to discuss the impacts of this development in this EIS.

(Item 5) The EIS has been extensively rewritten. Secondary impacts are covered in considerable detail.

U.S. FOREST SERVICE, 8-31-72

(Par. 2) As pointed out in Section IV G, the problem of the city water lines has not been resolved at the time of this writing.

The right-of-way will be revegetated to help aesthetics. Shrubbery is ineffective in reducing noise levels.

DEPARTMENT OF FISH AND GAME, 3-15-74.

(Par. 2) The project will not encroach on this property.

State of Montana

State Department of Health
and Environmental Sciences
HELENA, MONTANA 59601

JOHN S. ANDERSON, M.D.
XXXXXXXXXX
Director

July 10, 1972

MONTANA HIGHWAY COMMISSION
RECEIVED
JUL 12 1972
HELENA, MONTANA

Mr. H. J. Anderson
Director of Highways
Montana Highway Commission
Helena, Montana 59601

ATTENTION: Grover O. Powers, P.E.

Re: Environmental Impact Statement,
Project F 249 (18) Helena West,
Lewis & Clark County

Dear Mr. Anderson:

The above referenced environmental impact statement has been reviewed by our office. From information which has been provided, it would appear that adequate consideration has been given to air and water pollution control.

An adverse effect that was not emphasized in the report is that improved roads usually lead to increased subdivisions outside of the city. This increases traffic, and therefore, adds to air pollution emissions. Also, this encouragement of subdivisions erodes the city tax base, contributes to the deterioration of the downtown area and encourages strip-type business development. Further, subdivisions outside of the metropolitan area also create additional solid waste disposal problems and could contribute to water pollution because of the necessity of using individual type sewage disposal facilities.

On page 16 at the bottom of the page, there appears to be a contradiction. It states in the second to the last sentence, "Since traffic density will not be changed" and then the concluding sentence says, "The reduction in air pollution gained by reducing congestion will be offset by an increasing number of vehicles." Increasing the number of vehicles will in all probability increase the traffic density in the area, therefore will possibly increase air pollution.

Construction work on the beginning of the project near the Helena water system settling reservoir should be coordinated with the City of Helena so that the public water supply for the city will not be endangered by the construction operations. Dust and wind blown contamination may enter the settling basin.

The place for servicing of vehicles and equipment should be so located on the project that it will not in any manner endanger the city water supply.

Plans for any changes or relocation of the City of Helena water lines must be submitted to the State Department of Health and Environmental Sciences for review and approval before construction is started.

From the information which has been provided, it appears that the completion of this project will have a long-range beneficial effect on the environment and that the advantages of the project outweigh the minor adverse effects which may be anticipated. Therefore, we give favorable comment to this project with the request that careful consideration be given to the above items.

Very truly yours,

A. W. Clarkson

A. W. Clarkson, P.E.
Water Quality Bureau
Environmental Sciences Division

AWC:sh

Date Recd. Preconst. 7-1[illegible]-72
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MONTANA HIGHWAY
RECEIVED
JUL 1 9 1972
HELENA, MONTANA

City of Helena OFFICE OF THE MAYOR

Mr. H. J. Anderson
Director of Highways

Attention: Mr. Grover O. Powers, P. E.
Supervisor - Preconstruction Section
Montana Highway Department
6th Avenue & Roberts
Helena, Montana 59601

RE: F 249 (18)
Helena - West

Gentlemen:

This is to advise you that we have reviewed the Environmental Impact Statement for the reference project, and herewith wish to express our approval and recommendation for construction.

In our estimation the benefits of the proposed project far outweigh any of the adverse environmental problems outlined in the report, and that the project will in effect be of great benefit to the traveling public and the City of Helena.

Respectfully,

Stephen F. Keim
Mayor

dg

STATE OF MONTANA
Environmental Quality Council

ANA HIGHWAY COMMISSION
RECEIVED
JUL 12 1972
HELENA, MONTANA

July 11, 1972

Department of Highways
Helena,
Montana

Attention: Mr. Grover O. Powers, P.E.,
Supervisor - Preconstruction Section

Gentlemen:

This will acknowledge receipt of the draft environmental impact statement on the following project:

Helena-West F 249(18)

We will accept this statement pending any further expression of public interest.

Sincerely yours,

FLETCHER E. NEWBY
Executive Director

FEN/mb

Date Recd. Precons. 7-12-72
MAIL ROUTE
File

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL BUILDING, 19th AND STOUT STREETS
DENVER, COLORADO 80202

REGION VIII

MONTANA HIGHWAY [illegible]
RECEIVED
JUL 31 1972
HELENA, MONTANA

July 25, 1972

IN REPLY REFER TO:
8M

Mr. Grover O. Powers, P.E.
Supervisor - Preconstruction Section
Department of Highways
State of Montana
Helena, Montana 59601

Dear Mr. Powers:

Subject: Comments on Draft Environmental Statement
Project F-249(18)
Helena - West
Lewis and Clark County

We have reviewed the subject draft Environmental Statement transmitted to us by your June 27, 1972 letter.

The Environmental Statement provides sufficient information concerning the impact of the proposed project on the urban environment to enable us to evaluate this aspect of the project. As you know, HUD is primarily concerned with (1) the effect of a proposed action on the urban environment and (2) the consistency of such actions with the comprehensive planning for the area.

Our only comment with regard to the proposed project is that methods of minimizing the adverse environmental effects which are inherent with construction activities; i.e. noise pollution, air pollution, etc. be considered, particularly where the construction will be in close proximity to the urbanized areas.

If you have any questions on the above comments, please do not hesitate to contact us.

Sincerely,

John J. Wilder
Assistant Regional Administrator
Community Planning and Management

United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 1696
Helena, Montana
59601

MONTANA HIGHWAY COMMISSION
RECEIVED
JUL 28 1972
HELENA, MONTANA

July 25, 1972

Mr. R. S. Anderson
Director of Highways
Montana Department of Highways
Helena, Montana 59601

Your reference F249(18)
Helena-West

Dear Mr. Anderson:

As requested in your letter of June 27, 1972, we have reviewed the Draft Environmental Statement for Project F249(18), Helena West, with respect to the water resources of the area.

Detailed discussion of the hydrology of the area is not included in the statement, but measures to minimize harm to the water resources of the area appear to have been considered and included in the project. Consideration of the water resources appears to have been adequate except, perhaps, for mention of the warm spring near station 1050+00. The spring is rather unique in the area. The roadway is several hundred feet from the spring and does not endanger it; however if blasting near the spring is necessary during construction, then its possible effects on the spring may be worthy of consideration in the statement.

Sincerely,

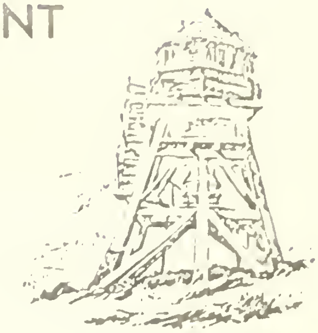
George M. Pike
District Chief

cc: Regional Hydrologist, CR, Lakewood, Colo.
Asst. Chief Hydrologist for R & TC, Washington, D.C.
Code 4300 0016, Attn G. Davis or G. Chase

Mail & file

CITY-COUNTY PLANNING DEPARTMENT
City of Helena, County of Lewis and Clark
Montana

Don L. Kinney
Director of Planning



Date Recd. Preconst. 8 7 72

MAIL ROUTE	Initial	Attach	Info	Act
30 GOP | RMH				
30 Field Design				
30 Surfacing Design				
31 Office Engineers				
32 [illegible] Region				
32 Landscape				
33 East Region				
34 Hydraulic				
36 T[illegible]c				
37 P[illegible] Planning				
38 [illegible] Roads				
3[illegible] [illegible] Design				
File				

August 3, 1972

Mr. Grover O. Powers, P.E.
Supervisor - Preconstruction Section
Montana State Highway Department
Capital Station
Helena, Montana   59601

RE: Environmental Impact Statement for Project F-249(18)
Helena - West, Lewis & Clark County

Dear Mr. Powers:

The staff of the Helena City-County Planning Board has reviewed the above mentioned impact statement. Many of the inherent problems of road construction were touched on lightly in the report and in our opinion were not fully investigated for their potential impact or were grossly understated.

On page 4, first paragraph, you state in part: "..., and will help open the Rimini and MacDonald Pass areas to increased residential and recreational development." We must assume that this statement is correct. If it is, we must also assume that locally oriented traffic on the road will increase the ADT in substantial amounts. We do not see provision to protect the main purpose of the highway, which is, in our opinion, to move traffic from Helena to I-90 at Garrison at 70 MPH speeds. An arterial such as US-12 should be for through traffic with local access as a secondary and minor function, but we do not find provisions for limited access or frontage roads to feed onto this project when the expected "residential and recreational development" and commercial development takes place. Will this project without these provisions for limited ingress and egress points really be a "faster, safer route for the local and general traveling public"?

Your statement that a comprehensive land use plan for the affected area is not completed is a true statement. We hope that within three or four years that one will be completed for the area with the needed implementing tools. However, the priorities of the Board at this time are directed at other problem areas within its jurisdictional area and time or resources do not allow us the opportunity to do the needed in-depth study for this particular area. In short, we do not have a crucial "problem" along this route at present, however, we see that with the completion of this project the problem will become more acute.

Proper landscaping of the area adjacent to the project is of great concern to the staff of the Board. Please note the inconsistancies of statements on pages 10 and 19 of your report. On one hand you say some improvements will be made and on the other hand you state that you "may" do some planting. We totally agree that Helena has very unattractive entrances to the City. We hope that the promised grassed median (page 2) will be provided and maintained.

In summary, we agree that a "do nothing alternate" is not the best, however, we would recommend that if it is at all possible that a system of limited access points be planned and developed at this time to help protect this project and to help control future development in the area.

If myself or my staff can be of further assistance please feel free to contact us.

Sincerely,

Mr. Donald L. Kinney
Planning Director

jh

cc: Walt Anderson, City Manager

Mr. H. J. Anderson
State of [illegible]
6th Avenue & [illegible]
Helena, MT 59[illegible]

Dear Mr. Anderson:

In reply to your letter dated [illegible], with reference to F 249 (1[illegible]) [illegible] post office [illegible] in the [illegible] feel are well taken. [illegible] project.

Our main concern is the delivery of the mail to our customers on both sides of the [illegible] delivery is made by Star Route and Rural [illegible] up to and back from [illegible] to boxes along [illegible].

We request that you take into your planning [illegible] Lane and Frontage roads for delivery of the mail to our customers on both sides.

We sincerely thank you for your consideration in asking for our comments, if we can be of any further help, please call or write.

With best personal regards, I am.

Sincerely,

[illegible]
Postmaster

cc:Supt of Mails
Asst Supt of Mails

[illegible]

United States Department of the Interior
OFFICE OF THE SECRETARY
MISSOURI BASIN REGION

BUILDING 67, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

IN REPLY REFER TO:
ER 72/826

AUG 11 1972

Mr. Grover O. Powers, P. E.,
Supervisor-Preconstruction Section
Montana Highway Commission
Helena, Montana 59601

Dear Mr. Powers:

This is in reply to your letter of June 27, 1972, requesting comments on the draft environmental statement for the proposed reconstruction of U. S. Route 12, program F-249 (18) in Lewis and Clark County, Montana. We have reviewed the draft and herein submit our comments.

1. Description of the project.

    This section does not make clear how much, if any, of the existing highway will be retained and utilized as part of the four-lane roadway. Other parts of the statement appear to imply that the entire four-lane route will consist of new roadway. This point should be clarified in the final statement. In general, we believe utilization of the existing highway as one set of lanes for a four-lane route minimized the adverse environmental impact of such projects. We would urge the Montana Department of Highway to utilize the present Route 12 roadway to the maximum extent possible.

    In addition, further information on design and location of the proposed bridges would be helpful.

2. Description of the existing environment

    This section should be expanded to include a description of wildlife in the project area. The present recreational use of the area, especially fishing in Ten Mile Creek, also should be covered.

3. Probable environmental impact of the project

    Although the statement is made (page 3), that "little channel relocation or stream bank damage will be necessary", the draft should describe the extent of such action and assess its environmental impact. It should be noted that the opening of the Rimini and MacDonald Pass areas to

residential and recreation development (page 4) is a project impact, and should be discussed as such. In fact, secondary environmental impacts may be more significant than impacts resulting from initial construction alone. The long-range impacts on fish and wildlife and recreational use of the area should be covered.

In other projects crossing wildlife migration routes, where highways have been widened and designed speeds raised, an increase in wildlife killed by motor vehicles has resulted. It would seem reasonable to anticipate a similar phenomenon in the project area. The environmental statement should discuss this impact.

Other points should also be addressed: Exactly where will fill for the project be obtained? What will be the social and environmental impact of extraction operation? What will be the impact of the proposed bridge construction on water quality and the "excellent trout habitat"? Aesthetic impacts of the project should also be covered.

We request the State Liaison Officer for the National Register be consulted for matters pertinent to the Historic Preservation Act of 1966 (P. L. 89-665).

4. Remedial, protective, and mitigating measures

In this and other sections of the statement are recommendations for actions to minimize impacts of the project. There should be more positive statements that:

a. Removal of trees and vegetation along Ten Mile Creek will be kept to a minimum, as requested by the Montana Department of Fish and Game (page 11); and

b. "Tastefully designed landscape treatment" and "roadside plantings and beautification" (page 19) will be carried out.

We suggest the statement contain provisions whereby wildlife migration problems and auto-wildlife collisions could be solved by fencing or using mirrors to reflect auto headlights along game trails. We also recommend that the final statement explore the possibility of developing recreational facilities in conjunction with the proposed project, as provided in FHWA Instructional Memorandum 21-2-69 and PPM 21-19. For example, fisherman and/or boat access might be provided in conjunction with the bridges crossing Ten Mile Creek. Bicycle and other trails could be constructed along the highway right-of-way.

5. Alternatives to the proposed project

As mentioned in item 1, the extent to which the existing roadway will be utilized is unclear. We suggest that this section discuss the possibility of using the present Route 12 as either the east or west bound lane of the proposed project.

The alternate corridors referred to on page 22 should be discussed in greater depth. Each alternative should be discussed almost in the same detail as the proposed project, to allow the reader and/or decision maker select the best route.

6. Relationship between Local Short-Term Uses of Man's Environment and the Enhancement of Long-Term Productivity.

The scope of this section should be broadened to include not only economic benefits (generally considered a short-term use of man's environment), but also the long-term productivity of the total environment. Information presented in this section should bring into focus for the decision maker those tradeoffs (economic, short-term versus environmental, long-term) involved in the project. We suggest that the final statement address these issues in greater depth.

We are pleased to have had the opportunity to review and comment on this environmental statement.

D. P. Shoup

D. P. Shoup
Field Representative

Date Recd. Preconst. [illegible]
MAIL ROUTE

[illegible]

ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
SUITE 900 1860 LINCOLN STREET
DENVER COLORADO 80203

August 14, 1972

Ref: AWIE

Mr. Grover O. Powers, P.E.
Supervisor - Preconstruction Section
Montana Department of Highways
Helena, Montana 59601

Dear Mr. Powers:

The Environmental Protection Agency has reviewed the draft environmental statement for Project No. F-249(18), Helena-West, and offers the following comments.

1. It is reasonable to expect that the project can be constructed and maintained in a manner that will minimize the direct adverse environmental effects on the environment.

2. From the draft statement, it is assumed that Highway 12 will eventually be extended across the Continental Divide to connect with I-90 at Garrison. If this is the case, the statement should be expanded to include an evaluation of the total highway improvement.

3. The draft indicates that subdivision of property is now taking place adjacent to the present highway in the vicinities of Ten Mile Creek and the old golf course. The fact that subdivision is presently occurring may indicate that the subdivision would take place in the absence of the highway improvement or that it is taking place in anticipation of the improvement. The final statement should discuss to what extent the proposed improvement will spur development in the area.

4. It is indicated that the proposed improvement "will help open the Rimini and MacDonald Pass areas to increased residential development." While it is true that this may help increase Helena's sphere of influence and benefit the existing population both socially and economically, it is equally true that increased development in the Rimini-MacDonald Pass areas could result in significant detrimental environmental effects. Though several things are necessary for development, e.g., water and sewer service, electrical service, and road development, any one of them could be the catalyst that starts development. The final statement

should discuss (1) existing developments and any planned developments in the area and their impact on land, air, and water resources, (2) time frame for development, and (3) the extent to which the proposed improvement is a significant factor in spurring development in the area.

5. Summary. There is a reasonable degree of assurance that the proposed project can be constructed and maintained in a manner to minimize direct adverse impacts on the environment.

   The major impacts of the proposed project appear to be those which may be classified as secondary such as "the effect of any possible change in population patterns upon the resource base, including land use, water, and public service, of the area in question." [CEQ Guidelines, Section 6(a)(ii)]. We recommend that the statement be expanded to include a full discussion of the secondary impacts in order to fully evaluate the environmental impact of the proposal.

We will be pleased to discuss these comments with you at your convenience. Please send us a copy of the final environmental statement.

Sincerely yours,

John A. Green
Regional Administrator

Date Recd. Preconst. 8-17-7[illegible]
Act
Info
MAIL ROUTE
Com[illegible]
File

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

Region 1, Missoula, Montana 59801

RECEIVED
[illegible] 1972
HELENA, MONTANA

REPLY TO: 1940 Environmental Statements

SUBJECT: Draft Environmental Statement for F249 (18) Helena-West

TO: H. J. Anderson
Director of Highways
Department of Highway
6th Avenue and Roberts
Helena, Montana 59601

We have reviewed your draft environmental statement for Helena-West. Subject to the following comments it meets with our approval.

We suggest that the relocation of the city waterline be made before highway construction or in conjunction with construction. Also, shrubbery planting should be made along residential areas to reduce noise level and add to esthetics.

STEVE YURICH
Regional Forester

Date Recd. Preconst. 7-5-72

Act	Info	MAIL ROUTE	Action	Initial

March 5, 1974 39-JGS

F 249(18)
Helena-West

Mr. Ashley C. Roberts
Administrator, Recreation and
Parks Division
Montana Department of Fish and Game
Sam W. Mitchell Building
Helena, Montana 59601

Dear Mr. Roberts:

The Department of Highways is in the process of preparing the final environmental statement for the subject project.

This project begins about 8 miles west of Helena just east of the Rimini Road turnoff and extends easterly about 6 1/2 miles to the Fort Harrison road turnoff. It will generally follow the alignment of present U.S. 12.

We would appreciate a letter from you identifying any properties in the project area which may be eligible for nomination to the National Register of Historic Places. To our knowledge their are none presently listed in the Register.

Thank you for your consideration in this matter.

Very truly yours,

H.J. ANDERSON,
DIRECTOR OF HIGHWAYS

By____________________________
Stephen C. Kologi, P.E.,
Supervisor-Preconstruction Sect.

39-SCK/GLA/lm

cc: G.L. Anders

[illegible]

STATE OF MONTANA

DEPARTMENT OF

FISH AND GAME

Helena, Montana
March 15, 1974

Re: F 249(18)
Helena-West

Mr. Stephen C. Kologi, P.E.
Supervisor-Preconstruction Sect.
Montana Department of Highways
Helena, Montana 59601

Dear Mr. Kologi:

There are no historic sites west of Helena near the highway project area that are listed on the National Register of Historic Places.

There is one site in the area, however, that is listed in the State Historic Preservation Plan which appears eligible for nomination to the National Register. This is the Broadwater Hotel and Spa at the Fort Harrison road turnoff. There should be no conflict with this site if the proposed highway project does not encroach upon the fenced property around the Hotel.

Please let me know if I can be of any further assistance.

Sincerely,

Ashley C. Roberts
State Historic Preservation Officer

ACR:DGC:op

MAIL ROUTE

mments Received at the Public Hearing

Comments made at the August 27, 1973 Public Hearing were generally very critical of e project as proposed. For this reason, and because of the many critical comments in ply to the draft, the Final EIS was rewritten extensively to better explain the Depart- nt of Highways' reasons for the project and to clarify the impacts. A second hearing ll be held to afford the public opportunity to comment on the revisions resulting from e first hearing.

The following discussion summarizes the concerns expressed during the hearing and our sposition of this input.

(1) The need for a 4-lane facility was questioned. Some people felt an improved 2-lane th left turn bay would be more suitable.

Reply: Section I contains an expanded discussion of our reasoning for the proposed lane. The 3.8 mile rural section would not be constructed to 4-lane immediately.

(2) One individual requested that the speed limit for the 4-lane through Dotsonville 45 miles per hour instead of 50-60.

Reply: To meet present design standards, the 4-lane through Dotsonville would have be built to safely handle vehicles traveling 50-60 miles per hour. If the road were de- gned for a slower speed, speeding vehicles would stand a much greater chance of leaving e roadway and endangering lives and property along the route.

Designation of the legal speed limit is another matter entirely. Speed limits e commonly the speed at which 85 percent of the drivers traverse a given section of road. is assumed that 85 percent of the drivers operate their vehicles in a reasonable man- r. Studies have shown that the condition of the road and the degree of urban development tually determine the speed at which people drive. Arbitrarily designated speed limits e generally ignored by the public.

(3) Concern was expressed over the increase in noise expected due to the road being cated closer to houses along the route. A request for noise abatement measures was made.

Reply: The noise impact of the project was completely reevaluated for the Final S (Section IV, I.).

(4) Considerable confusion was shown over plans for sidewalks, bicycle paths, and orse paths.

Reply: Tentatively, we propose to construct both a concrete sidewalk and a orse and bicycle path on the north side of the road through the Dotsonville area, between he curb and the houses.

(5) Several individuals opposed the design of the junction between the Colorado Gulch oad and the proposed facility on the grounds that it would not provide adequate sight disance.

Reply: We disagree. However, we are seriously considering a minor change in lignment which would put the project on the border between the Reinhold Issak and David attice properties. This change would have two advantages. It would avoid splitting the ssak property into two parts, and it would facilitate a change in the junction with the olorado Gulch Road. If this alignment revision is adopted, the junction would be changed.

(6) It was suggested that the route be built along a different corridor to avoid inringement on the private properties along the present road.

Reply: See Section II.

(7) Concern was expressed about building the road over the city water lines.

Reply: See Sections IV, G, and M.

(8) The new road might eliminate part of the irrigation system of the R.V. Ranch ompany.

Reply: This problem would be resolved during the right-of-way negotiation stage.

(9) Concern was expressed over moving cattle back and forth across the new road.

Reply: This problem would be resolved during the right-of-way negotiation stage.

(10) Concern was expressed over the type of right-of-way fence which would be contructed.

Reply: We would put up a legal fence at least equal to the fence that was dislaced.

APPENDIX

TERMINOLOGY RELATING TO NOISE

During recent years there has undoubtedly been an increase in environmental noise. In addition, everyone has become more aware of noise. Although the growth of noise may be a symbol of growth in technology, the increased awareness of the public toward noise has brought on a rapid response everywhere in trying to abate noise. Highway traffic noise is one of the identifiable problem areas; this has been caused by (1) increased size and number of vehicles, (2) greater concentration of traffic on major highway routes, and (3) increased use of land near highways to fill the residential and commercial needs of a growing population.

Just as "feet" are used to measure distance, and "degrees" are used to measure temperature, "decibels" are used to measure sound intensity. The ear is responsive to sounds having a tremendous spread in intensity variation: a "strong" sound, such as a diesel truck, may produce sound energy that is 1,000,000,000 times greater than that produced by a "weak" sound such as a cricket, for example. Because of this large spread in every day signal strengths, and because the sensitivity of the ear is more nearly logarithmetic than linear in its response, it was decided long ago to express sound levels on a logarithmetic scale, since this can compress the large spread of intensities into a more practical numerical system. Thus, "decibels" are logarithmetic units. The decibel is abbreviated, "dB".

Just as there is, in concept at least, a "standard foot" that serves as a reference length for distance measurements, there is a reference sound pressure upon which the decibel scale is based. Actually, this reference base represents approximately the weakest sound that can be heard by the average young, alert, undamaged ear in the frequency region of maximum sensitivity. The "0dB" level on the decibel scale represents this weakest sound having the reference sound pressure.

Sound pressure level alone cannot be taken at face value as an indication of loudness. The frequency or pitch of a sound also has a considerable effect on human response. The

frequency of a sound wave is the number of times it repeats itself in each second (i.e., the rapidity with which the pressure fluctuations occur). Frequency is expressed in cycles per second, or Hertz (Hz); one Hertz is one cycle per second. The audible range of frequency is from 20 to 20,000 Hertz, but the ear is much more sensitive to sounds with frequencies near 1,000 Hertz than those near the range extremities. In order for a sound at 100 Hz to seem as loud as a sound at 1000 Hz, the pressure level would have to be about 20 decibels greater at the lower frequency. Most traffic noise has frequencies in the 100 to 1,000 Hz range, with engine noises occurring within the lower frequencies (100-250 Hz) and tire whine and wind turbulance toward the upper limit of the range (near 1,000 Hz).

Very few sounds are pure tones; i.e., consisting of a single frequency. To measure sound precisely, it would be necessary to measure pressure levels for each of the multitude of frequencies which make up the sound. It is usually not convenient to measure sound level in this manner. A simplified procedure consists of dividing the audible range of frequencies into 9 octave bands, obtaining pressure levels for each band, and then combining the results into a single value. By weighting the sound pressure level for each octave band, an aggregate value can be obtained which approximates the response of the human ear to the sound pressure of the composite frequency.

The sound-level meter is the basic instrument of noise measurement. The current American Standard Type 1 and Type 2 sound level meters can measure three alternate frequency response characteristics. These three responses are obtained by weighting networks designated as A, B, and C. The chief difference among the weighting characteristics is that very low frequencies are discriminated against quite severely in the A network, moderately by the B network, and hardly at all by the C network. Therefore, if the measured sound level of a noise is much higher on the C weighting than on the A weighting, much of the noise is probably of low frequency. The weights which have been found to closely represent the range of human hearing and response to traffic noise are those represented by the A scale. The resultant sound level is abbreviated dBA. All of this may seem a

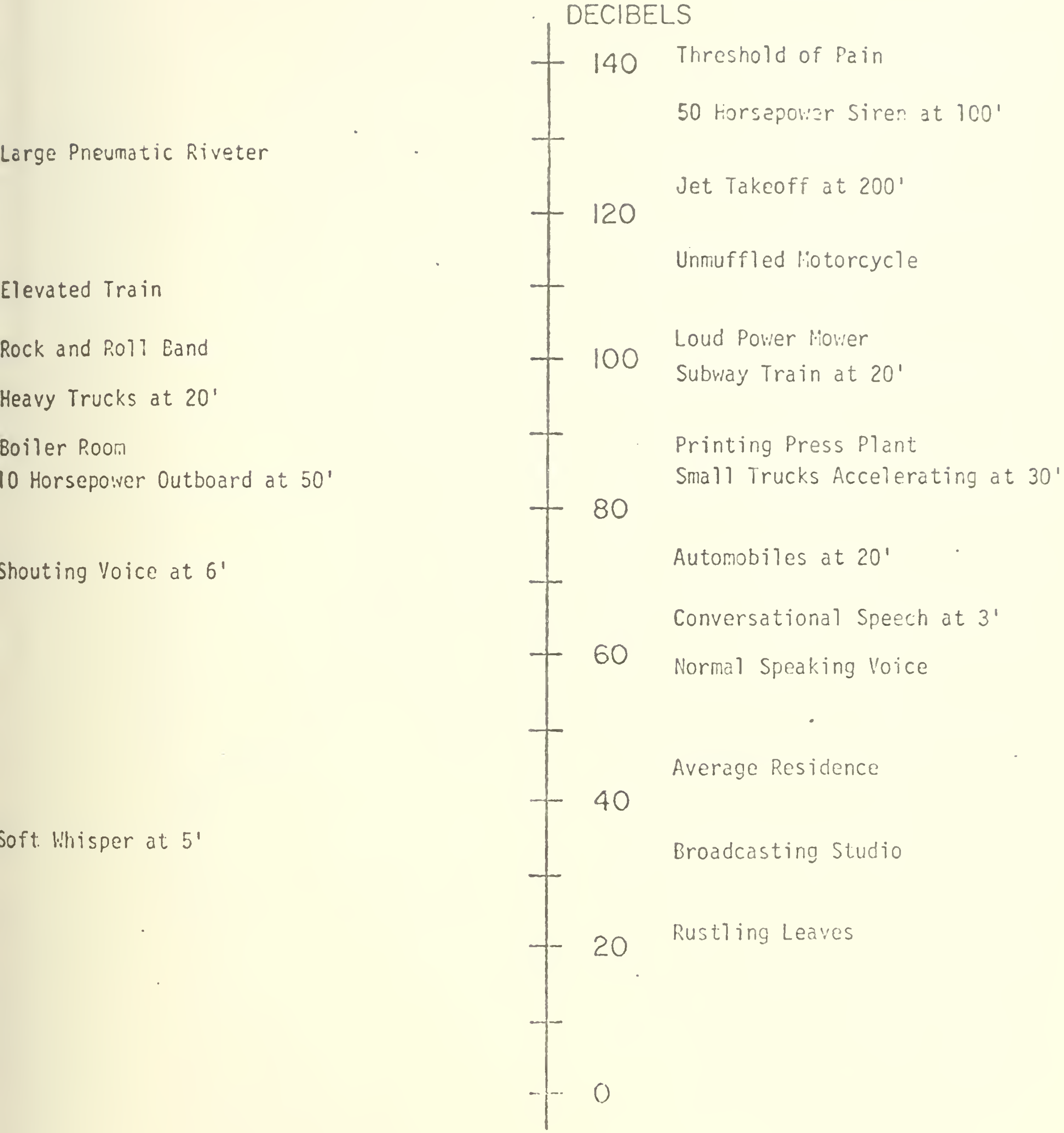
little confusing to the layman, but the chart in Figure 1 will give a person a good idea of how loud a noise level is.

The Federal Highway Administration of the U.S. Department of Transportation, in recognition of the highway traffic noise problems issued on April 26, 1972, an advanced copy of its Policy and Procedure Memorandum ("P.P.M.") 90-2 on "Interim Noise Standards and Procedures for Implementing Section 109 (i) of Title 23, United States Code." This was updated by the February 8, 1973, final version of PPM 90-2, entitled "Noise Standards and Procedures".

Because traffic noise contains fluctuations in noise levels, therefore, the levels must be studied on a statistical basis. After considering all of the noise evaluation procedures, it was finally determined by the Federal Highway Administration and interested assocaited groups that the L_{10} and L_{50} noise levels would be used as the principal noise descriptors for highway design. The L_{10} level is simply the noise level exceeded 10 percent of the time and the L_{50} level is the noise level exceeded 50 percent of the time. Figure 2 is a chart sample of traffic noise during a one-hour period in a normal suburban neighborhood. The L_{10} level for a one-hour period is simply that level which is exceeded for 10 percent of the time, or 6 minutes during the hour.

A few general relationships may be helpful in understanding some of the principles of sound generation and human response. A doubling of the noise source produces a 3dB increase in the sound pressure level. Subjective tests have determined that the smallest change in noise level perceptible to the ear is approximately 2dB and that an increase of 10dB in the noise level will cause the noise to sound about twice as loud to the average listener. If a traffic stream of 400 vehicles per hour (vph), for example, produces a noise level of 50 dBa at a certain distance from the observer, 800 (vph) traveling at the same speed and under identical conditions, would produce 53dBA, a change which is hardly noticeable. A further increase to 1600 vph would produce 56 dBA and 4000 vph,about 60 dBA. Thus, a tenfold increase in traffic volume would result in an increase of 10 dBA and would sound about twice as loud to the average listener as 400 vph.

A decrease of 10dB will appear to an observer to be a halving of the apparent loudness. For example, a noise of 70 dB will sound only half as loud as 80dB, assuming the same frequency composition and other things being equal.



Decibel Range of Common Sounds, Measured at the Source or the Indicated Distance

Figure 1

$$L_{10} = \Delta_1 + \Delta_2 + \Delta_3 + \Delta_4 = .10 \times T_T$$

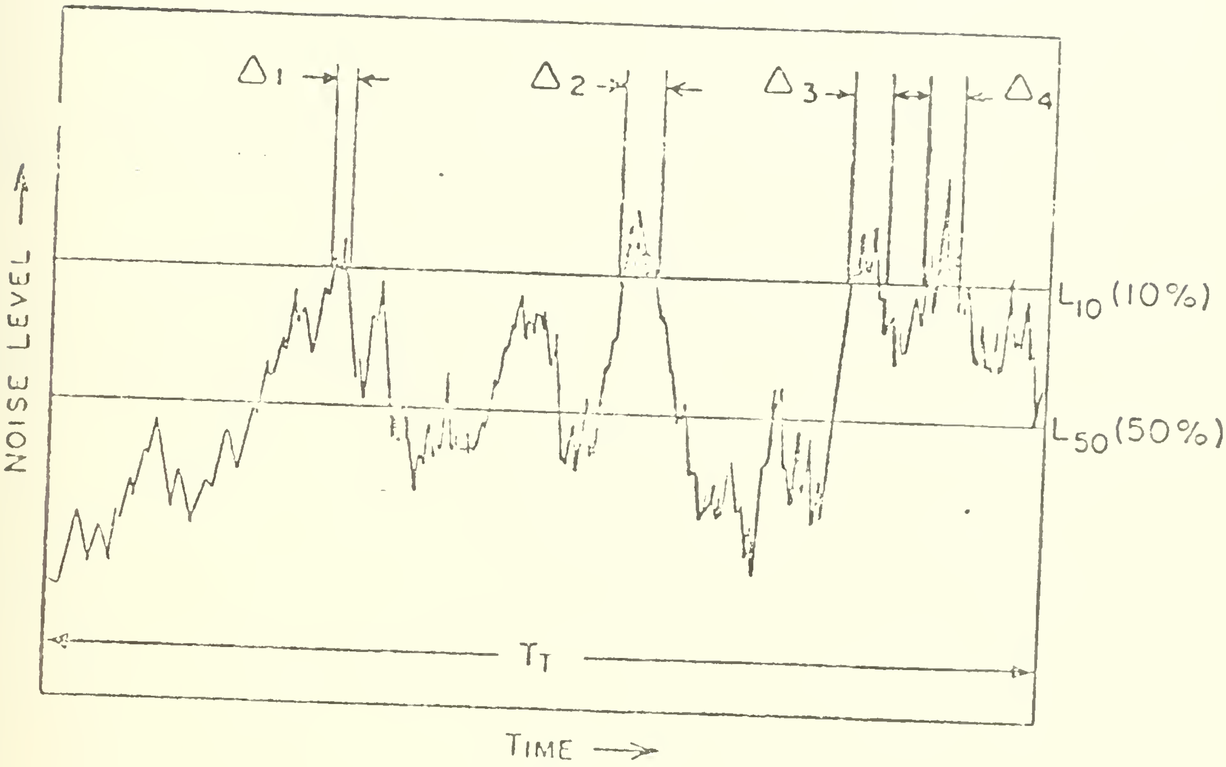


Figure 2

LITERATURE CITED

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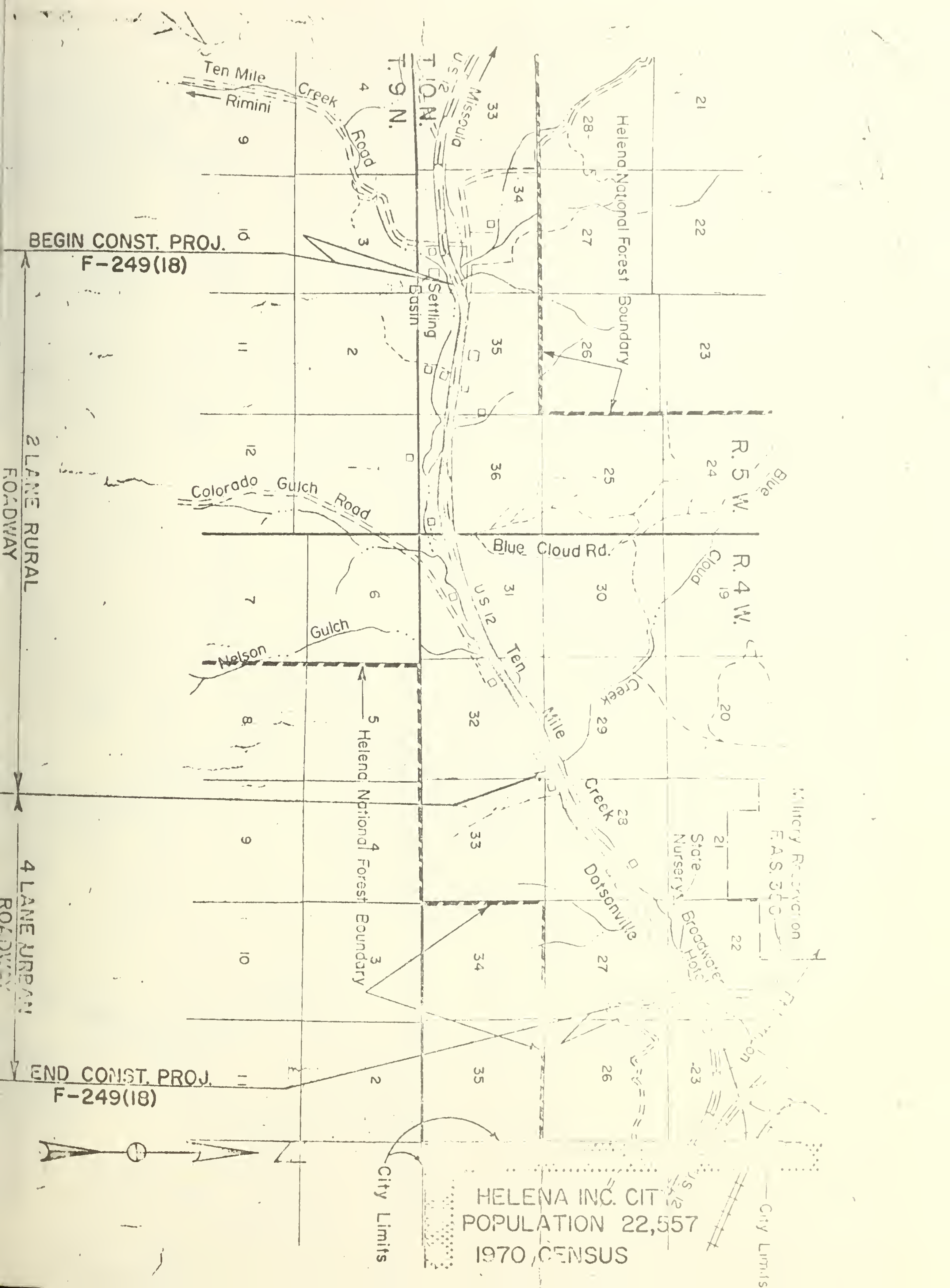
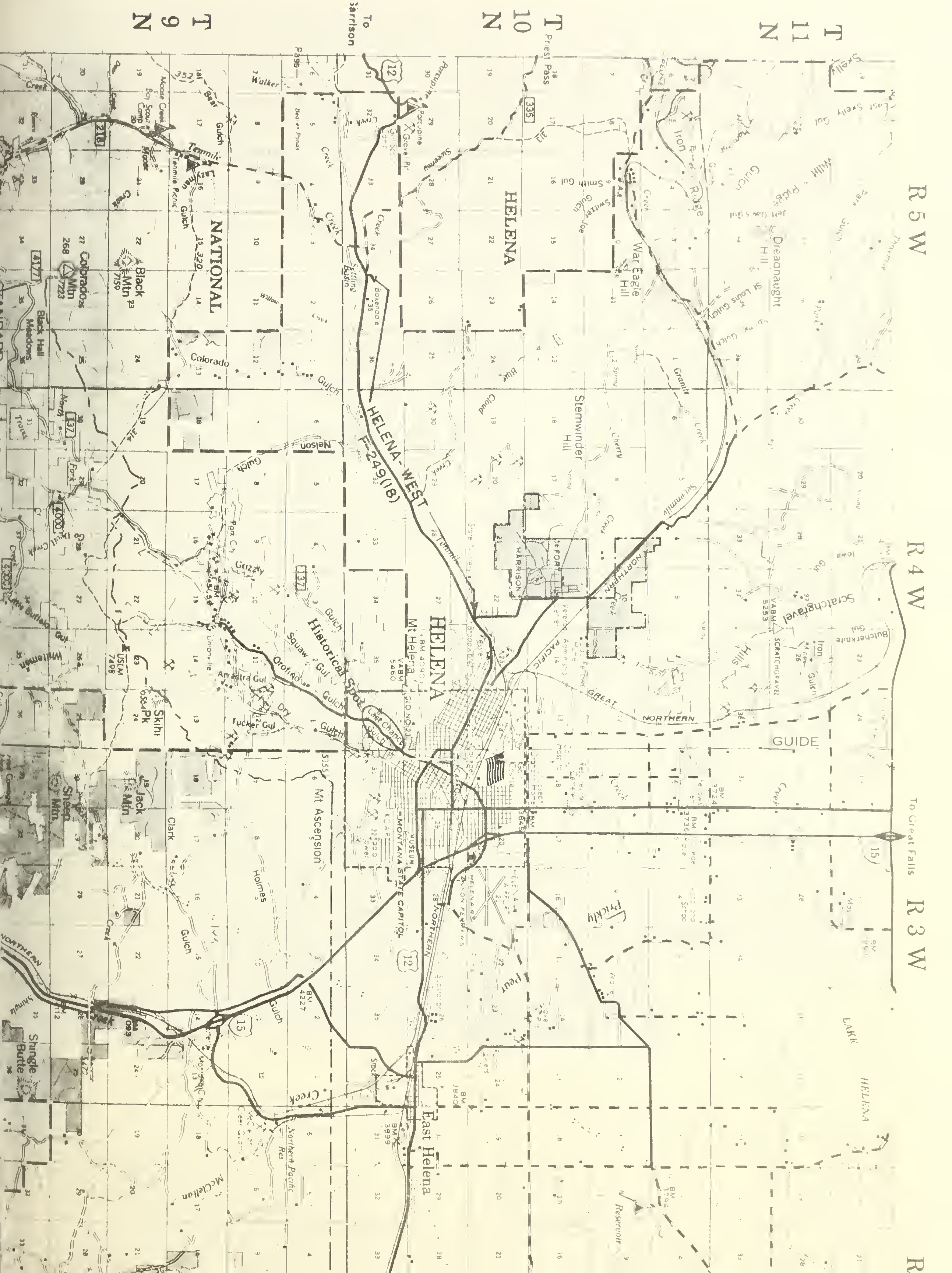
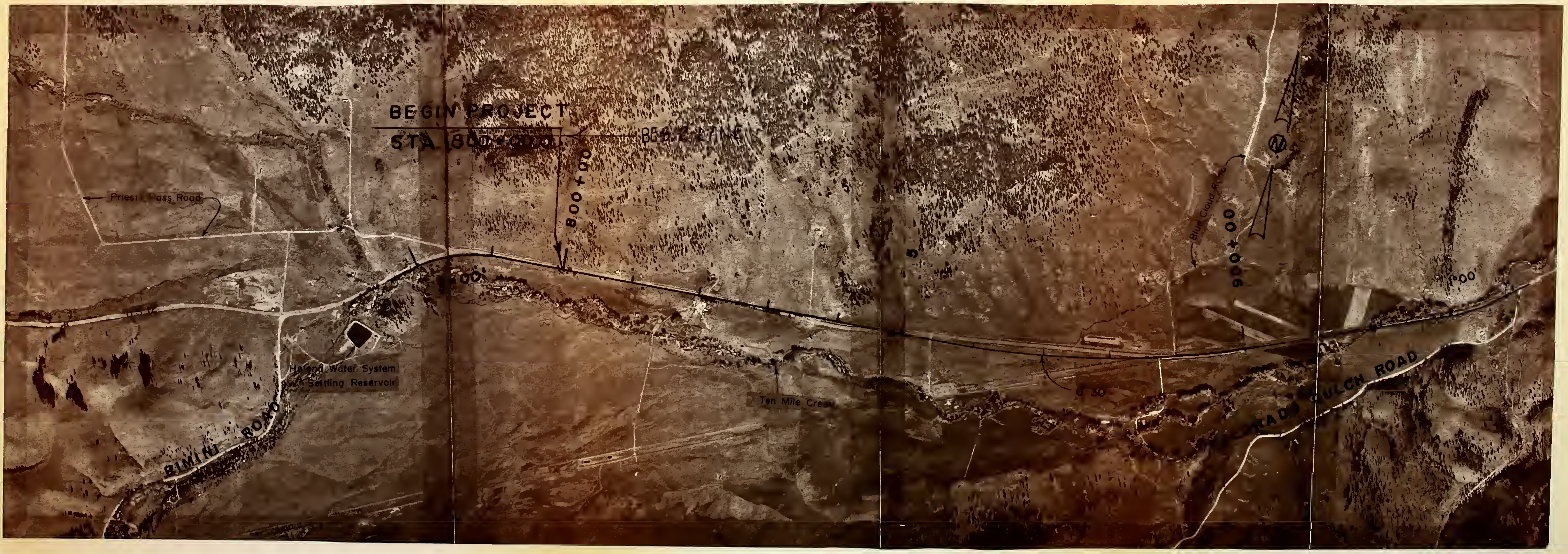
Montana Department of Highways. 1974. Approach Standards for Montana Highways. Helena, Montana 33 pp.

Reilly, R.E., and H.E. Green. 1974. Deer Mortality on a Michigan Interstate Highway. J. Wildl. Manage. 38(1): 1974.

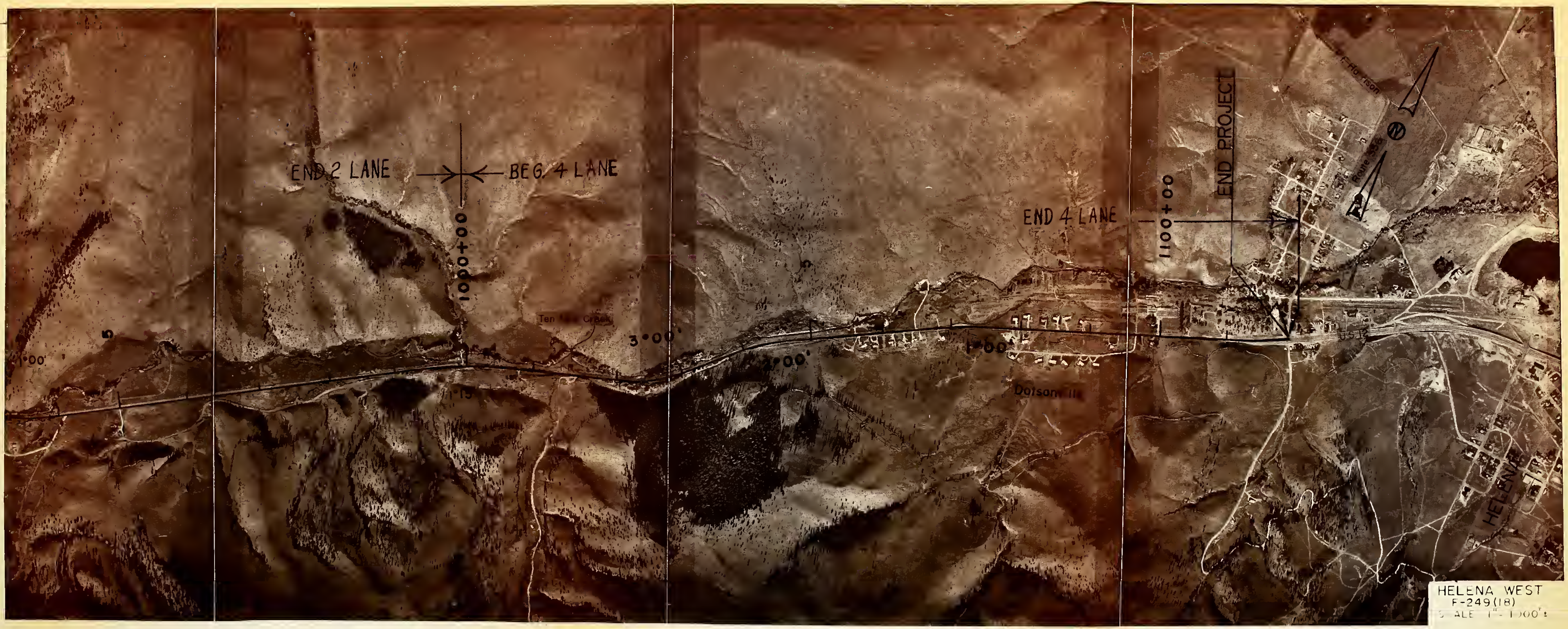
University of Montana, Bureau of Business and Economic Research. 1974. Helena, Montana, Economic Growth Study. Missoula, Montana 125 pp.


Ten Mile Creek Road
Rimini
T. 9 N.
T. 10 N.
US 12
Missoula
Helena National Forest Boundary
BEGIN CONST. PROJ. F-249(18)
Settling Basin
R. 5 W.
R. 4 W.
Colorado Gulch Road
Blue Cloud Rd.
Blue Cloud Creek
US 12
Ten Mile Creek
Nelson Gulch
Helena National Forest Boundary
2 LANE RURAL ROADWAY
4 LANE URBAN ROADWAY
Dotsonville
State Nursery
Broadwater Hotel
Military Reservation
F.A.S. 3
END CONST. PROJ. F-249(18)
City Limits
HELENA INC. CITY
POPULATION 22,557
1970 CENSUS
City Limits


T 11 N
T 10 N
T 9 N
R 5 W
R 4 W
R 3 W
To Garrison
Priest Pass
To Great Falls
HELENA
NATIONAL
HELENA-WEST F-249(18)
Mt Helena
VABM 5460
Historical Spot
Last Chance Gulch
Mt Ascension
East Helena
MONTANA STATE CAPITOL
MUSEUM
FORT HARRISON
Stemwinder Hill
War Eagle Hill
Dreadnaught Hill
Iron Ridge
Scratchgravel Hills
VABM 5253 SCRATCHGRAVEL
NORTHERN PACIFIC
GREAT NORTHERN
GUIDE
LAKE HELENA
Reservoir
Black Mtn 7150
Colorado Mtn 7223
Skihi Pk
USLM 7408
Jack Mtn
Sheep Mtn
Shingle Butte
Black Hall Meadows
Tenmile
Moose Creek
Boy Scout Camp
Tenmile Picnic
Porcupine
Sitting Basin
Colorado Gulch
Nelson Gulch
Grizzly
Squaw Gul
Orofino Gulch
Dry Gulch
Tucker Gul
Arrastra Gul
Clark
Holmes Gulch
Prickly Pear
McClellan
Walker
Bear Gulch
Smith Gul
Switzer Joe Gulch
St Louis Gulch
Granite
Cherry Creek
Silver Creek
Iron Gulch
Butcherknife Gul
Union ville
12
15
287
335
137
4000
4177
218
BM 4227
BM 3845
BM 3840
BM 3899



HELENA WEST
F-249 (8)
SCALE 1" = 1000' ±



HELENA WEST
F-249(18)
SCALE 1" = 1000'±

THE GREAT SEAL OF THE STATE OF MONTANA
ORO -Y- PLATA